The Climate Crisis and the Nutrition Crisis are Intertwined

The need and the opportunity for policy actions to address both crises simultaneously

Summary

In this **Call to Action**, the multi-disciplinary experts of the Standing Together for Nutrition Consortium (ST4N) offer consensus recommendations to support climate adaptation and mitigation that will safeguard food and nutrition security against worsening climate risk.

Now is the time to align climate and nutrition policies—not only to protect global food systems and build climate resilience—but for the opportunity to safeguard the health and nutrition of millions worldwide.

Recommendations for Action

Recommendation 1: Promote supply-side policies to increase the diversity, yield, and nutritional quality of food. These include investing in climate-smart agriculture, scaling up biofortification and food fortification, improving storage and transportation to reduce food loss, promoting nutrient-rich traditional and indigenous crops, and repurposing agricultural subsidies.

Recommendation 2: Promote policies to increase demand for healthy and sustainable diets, equitably by supporting equitable access to nutritious foods, aligning public procurement and national dietary guidelines with climate and health goals, and using taxes and subsidies to promote more sustainable choices.

Recommendation 3: Build climate and nutrition resilience for vulnerable populations by scaling up proven nutrition interventions such as maternal micronutrient supplementation, breastfeeding promotion and protection, strengthening nutrition-and climate-smart social protection programs, and ensuring woman and girls are central to climate adaptation efforts.

Call to Action

Climate change is causing more frequent and severe extreme weather events, shifting weather patterns, and altering food systems—trends that will continue to worsen. Adapting to and mitigating the impact of a worsening climate—now and in the long term—is a major challenge but also a crucial opportunity to address malnutrition in vulnerable populations.

There is strong evidence that actions to mitigate or adapt to climate change can also improve nutrition, benefitting both climate and nutrition agendas. Yet, these two crises are often treated in isolation, limiting the impact of policies and investments in both areas.

Both climate change and malnutrition share common drivers and consequences, making it essential to align solutions. While there is an urgent need to increase investments in climate mitigation and adaptation measures, it is equally crucial to seize the opportunity to leverage climate investments and address hunger and malnutrition in tandem, especially for vulnerable populations. Achieving these joint outcomes will require:

- Stronger political will and commitment,
- More purposeful investments, and
- Coordinated, multi-sectoral collaboration and action.

This Call to Action builds on the latest evidence and the growing policy momentum recognizing the interlinkages between climate change and food systems. It highlights the urgent need for food systems to adapt to current and future climate risks that threaten food and nutrition security.

The evidence presented in this brief identifies policy pathways that support climate adaptation and mitigation while improving population resilience to climate-related shocks. While more research is needed to quantify the context-specific policy solutions, the recommendations outlined in this brief highlight actions that can be taken now to protect vulnerable populations.

Our Current Crises

Climate change poses an existential threat to food systems, with impacts already being felt worldwide.[1] Extreme droughts, floods, heat waves, and other climate events are disrupting agriculture, food production, and supply chains, pushing more people into hunger and malnutrition. These shocks are further aggravated by conflict, with dire impact on nutrition security, particularly in low-and-middle countries (LMICs).

Despite their interlinked drivers and consequences, climate change and malnutrition have largely been considered in isolation.[2] Food systems—particularly livestock production—are

responsible for one-third of global greenhouse gas (GHG) emissions that cause climate change.[3,4] At the same time, climate-change related increases in extreme weather events are intensifying risks for all forms of malnutrition through different pathways. Both crises have far-reaching consequences for nutrition security, health, poverty, and mortality.

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Climate Change Impact on the Malnutrition Crisis

In 2022 alone, climate change was estimated to drive an additional 151 million people into moderate or severe food insecurity, compared to the historical average from 1981-2010.[i,5] By mid-century, climate change is projected to further exacerbate already high levels of micronutrient deficiencies, as the availability of 30-79% of key nutrients (folate, iron, vitamin A, and B12) will be increasingly exposed to climate risks.[6] These trends could lead to a 30% increase in childhood stunting.[ii,8]

The global burden of malnutrition is staggering. Today, 733 million people are food insecure, a number that has risen sharply due to the COVID-19 pandemic, conflicts, and climate-related events. Over 35% of the world's population cannot afford a healthy diet—one of the leading factors in disease and premature mortality. The consequences are widespread: 148 million children are stunted, 45 million are wasted, and 50% of adults are overweight or obese.[9]

Despite the growing links between climate change and malnutrition, national climate and nutrition policies and global funding have not prioritized addressing their shared drivers and consequences. Only 2% of Nationally Determined Contributions (NDCs) and 28% of National Adaptation Plans (NAPs) include nutrition considerations.[10] This lack of integration reflects siloed priorities and underfunded solutions.

Yet, climate adaptation and mitigation policies present a major opportunity to make meaningful improvements in nutrition. Policies that address the interlinked supply- and demand-side drivers—such as increasing crop yields and nutritional quality while promoting sustainable dietary shifts—can drive measurable change. Additionally, nutrition interventions can build the resilience of the most vulnerable individuals, helping them adapt to the increasing challenges of climate change.

This policy brief by ST4N—a global consortium of climate, food system, nutrition, gender, and health experts—synthesizes policy-relevant evidence from the Intergovernmental Panel on Climate Change (IPCC), the Lancet Commissions, the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the World Bank, the Initiative on Climate Change and Nutrition (I-CAN), and the United States Agency for International Development (USAID),[iii] as well as relevant emerging evidence. It presents three consensus policy recommendations that call for bold, integrated climate and nutrition actions. These recommendations are particularly timely as policymakers shape commitments for major global fora, such as the 2025 Nutrition for Growth Summit and COP30, and as national action plans such as the NDCs and NAPs are updated.

> **Only 2% of Nationally Determined Contributions (NDCs) and 28% of National Adaptation Plans (NAPs) include nutrition considerations.**

i. Analysis based on FAO Food Insecurity Experience Scale, frequency of heatwave days and drought months for the growing seasons of maize, rice, sorghum, and wheat, shows that, compared to 1981–2010, more heatwave days during growing seasons in 2022 led to a 4.4 percentage point increase in moderate or severe food insecurity and more frequent droughts led 2.0 percentage point increase in food insecurity.[5]

ii. Based on Institute for Health Metrics and Evaluation (IHME) modeled impacts of climate change on malnutrition (child stunting and wasting), based on Coupled Model Intercomparison Project 6 (CMIP6) SSP2-4.5 scenario.[7]

iii. We summarize the evidence included in reports published in the last five years that had a global focus and addressed the negative impacts and solutions for the interlinked drivers and consequences of climate change and nutrition crises.

Recommendation 1

Promote Supply-Side Policies to Increase the Diversity, Yield and Nutritional Quality of Food

Problem: **Food systems are not climate-resilient, and climate change is reducing the nutrient content and yields of staple foods.**

There is strong evidence linking climate change with negative consequences for crop yields and nutritional quality, which in turn impacts the availability and affordability of both staple and nutrient-dense foods, thus contributing to food insecurity and malnutrition.

All types of foods are threatened by climate change, although the impact and severity vary by crop and region. Most concerning, yields of staple crops, such as rice, maize, and soybeans, as well as nutrient-dense foods, like fruits, vegetables, legumes, and nuts, are expected to decline due to rising temperatures, shorter growing seasons, and increased levels of carbon dioxide in the atmosphere and ground level ozone.[iv,11] Livestock and aquaculture, such as cows, pigs, chickens and fish—and their feed sources—are sensitive to drought and excessive heat. In addition, rising carbon dioxide levels are estimated to reduce the micronutrient content of staple foods, such as wheat, corn, and rice by 3–30% over the next 30 to 80 years.[v,12]

Declining food yields contribute to rising food prices, which reduces the availability and accessibility of diverse, nutritious foods. Past crises have shown that when food prices increase, lower income populations rely more on cheap staple foods, often at the expense of nutritious foods, such as vegetables, fruits, and animal products that provide the essential micronutrients needed for growth, development and health. Currently, more than half of the global population does not consume adequate levels of essential vitamins and minerals, including iron, folate, calcium, and vitamins C and E.[13] Dietary shifts towards more unhealthy diets have also been linked to rising rates of overweight/obesity, and diet-related chronic disease, such as diabetes, heart disease, and cancers.[5]

Solution: **Promote supply-side policies to increase the diversity, yield and nutritional quality of food produced.**

To build climate-resilient and nutrition-sensitive food systems, governments can scale up agricultural production and productivity, support incentives that are climate-smart and nutrition-sensitive, and expand the adoption of climate-smart agricultural practices that can offer sustainable alternatives to large-scale monoculture farming.

Regenerative agriculture practices can help replenish soil health, sustainably support biodiversity, and help build production systems that are more resilient to climate change.[14] Similarly, promoting **agrobiodiversity**—the diversity of plant, animal and microorganisms in food producing systems—benefits soil health and dietary diversity, with impact on human health and resilience.[15] Some regenerative practices have also been shown to increase the concentration of micronutrients in context-specific situations, such as higher zinc levels in rice grains and increased vitamin C concentration in tomatoes.[16] More research is needed to understand the impacts of these production practices on the nutrient density of a larger number of foods across various contexts. To ensure success, policies promoting these practices must balance the trade-offs, such as short- and long-term yield fluctuations for smallholder farmers, the potential need for additional labor and time, and the division of labor between men and women.

Implementation of these practices may require focused investments, technical support, and implementation research to further understand how to responsibly motivate local actors to integrate new processes within their routine agricultural activities.[17] Many of these practices are labor

iv. As carbon dioxide levels and temperatures rise, wheat productivity may grow, particularly in high altitude areas.[11]

v. At 550 carbon dioxide ppm concentrations in the next 30-80 years, compared to current conditions.[12]

intensive and, if implementation falls disproportionately on women, the time burden implications may be a barrier to adoption.[18,19]

To identify and scale-up **nutrient-rich indigenous and traditional "opportunity crops,"** which offer new methods to improve food and nutrition security, funding is needed to support initiatives such as the Vision for Adapted Crops and Soil program (VACS). VACS is working with the African Union to invest in plant breeding science for previously under-researched crops such as fonio, sorghum, millet, and other legumes, seeds, fruits, and vegetables, with the goal of increasing their nutritional value, production yields, and climate resilience, with low impact on emissions.


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Scaling up **biofortification and food fortification** is a cost effective way to boost the nutrient content of staple foods with minimal emissions impact. These fortification methods require effective policies that address standards, compliance and enforcement, and target those most in need. **Biofortification**, which is the process of increasing a plant's nutritional content through selective plant breeding, is a proven, cost-effective, and low-emissions intervention to address declines in key micronutrients (such as vitamin A, iron, and zinc) due to climate change.[20] Studies have demonstrated that biofortification significantly increases micronutrient intakes and improves functional health outcomes.[20] Biofortification is particularly cost-effective and impactful for rural farming households that rely on staple foods but have limited access to micronutrient-dense foods, processed fortified foods (such as flours), or supplementation.[21]

Food fortification—adding vitamins and minerals to staple foods post-harvest—is also effective in addressing micronutrient deficiencies. Fortification is widely acceptable, with millions already benefiting from fortification of salt, grain flours, and edible oils to correct or prevent specific micronutrient deficiencies, such as iron-deficiency anemia or iodine-deficiency disorders.[22] Fortified foods can also be targeted to vulnerable groups, such as pregnant women or school children.

Reducing food loss and waste is another targeted strategy for cutting GHG emissions, while potentially increasing the availability and quality (taste, appearance, and nutritional value) of nutritious foods.[23] Food loss and waste accounts for an estimated 8-10% of the total anthropogenic emissions, most of which occurs **during post-harvest, storage, and transport.** In lower income countries, food losses are mainly due to limitations in handling processes, such as cleaning, sorting, storage, transport or processing—the "middle of the food system"—and can be as high as 80%.[20,24] Policies that reduce food losses through improved agricultural practices, harvest efficiency, and cold chain, storage, and transport infrastructure could increase the efficiency and value of crops, improve livelihoods, and promote local nutrition security.[20] Additionally, new technologies such as renewable energy-powered refrigeration can offer a low-emissions m eans of reducing waste.

Fiscal policies on the supply side should also align agricultural subsidies with climate and nutrition goals. Currently, most subsidies favor animal source foods and staple crops, often at the expense of more climate-smart and nutritious foods such as fruits, pulses, and vegetables. Evidence suggests diversifying subsidies can lead to greater diversity in production and consumption, with associated reductions in GHG emissions and benefits to nutrition and health.[25]

Country Exemplars
Enhancing crop diversity, quality, and quantity

In **Zimbabwe**, the **enhanced wheat variety** (SAVE), bred to grow in both winter and summer seasons, and resilient to heat, drought, and yellow and leaf rust, achieved yields 30% above the level needed for national self-sufficiency.[26]

In **Nigeria**, a pilot efficacy study to **reduce food loss** demonstrated that plastic crates reduced grade-A post-harvest losses **by about 16-20%** versus losses from raffia baskets. This pilot study took a "bottom-up" approach by considering local contextual and cultural factors, and was designed to be owned by the local actors in the value chain.[27]

Recommendation 2

Promote Policies to Increase Demand for Healthy and Sustainable Diets, Equitably

Problem: Unhealthy, unsustainable diets increase climate change and impact health.

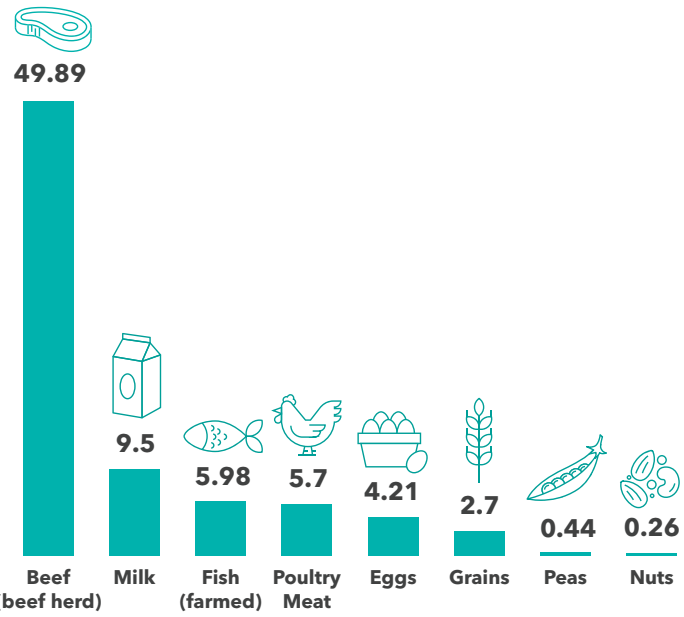
The way food is consumed is closely linked to both climate change and public health. As populations grow and incomes rise, dietary demands are growing in both quantity and unsustainability. By 2050, global food demand is expected to increase by 35-56%.[vi,28] While vulnerable groups in low income countries struggle to afford a diet with enough animal source foods to meet their nutritional needs, in other contexts, rising incomes are increasingly shifting demand towards more unsustainable—and often less healthy—diets, with more animal-source foods.[2] This global dietary shift represents a huge challenge for climate goals, as animal-source foods have the largest climate impacts of all foods.[4]

Changes in consumption patterns towards unhealthy foods are increasing the rates of diet-related non-communicable diseases, such as obesity, cancers, and heart disease, and susceptibility to infectious diseases; many of the foods driving this shifting burden of disease are also the least sustainable.[2,29]

Solution: Promote policies to increase demand for healthy and sustainable diets, equitably.

An equitable shift toward more sustainable and diverse food—reducing reliance on animal-based foods and increasing consumption of healthy, plant-centered diets—could significantly reduce food system-related GHG emissions.[29] To promote equity, higher income countries with high consumption of beef and ruminant-derived products must make the most substantive changes.[31] In LMICs, populations should be encouraged to preserve traditional diets while increasing consumption of healthy, nutrient-dense, plant-based foods such as nuts, fruits, vegetables, and legumes.[29,32] Although populations with high malnutrition rates may benefit from increasing their consumption of animal-based foods, substituting high emissions foods like beef with alternative protein-rich options such as chicken, eggs and/or with fortified foods can reduce the impact from these animal-based food emissions. Shifting to more healthy, sustainable foods will also help reduce the burden of diet-related non-communicable diseases.[2]

Figure 1: Environmental Impact of Different Protein Sources



Note: Total GHG emissions produced by 100 grams of protein.[4,30]

Governments can provide critical support for dietary shifts, particularly for vulnerable populations, through **procurement** of food **for school feeding or social protection programs** that align with national or adapted global **food-based dietary guidelines** (FBDG). In high income countries, like the United States, government spending on safety net programs and supplemental nutrition assistance programs significantly influences food access and consumption patterns, especially among poor and vulnerable populations.[33]

vi. Food consumption is approximated by total crop calories, including food and feed. Modeling mapped all projections to the shared socioeconomic pathways (SSPs) and the representative concentration pathways (RCPs).[28]

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Successfully driving a net shift to more healthy, sustainable diets will be challenging, but evidence is emerging on the effectiveness of demand reduction policies, such as national dietary guidelines, taxes on unhealthy foods, front-of-package labeling, and behavior change interventions.

Global FBDG are important policy tools, as they set the standards for many institutional food delivery programs. FBDG are increasingly recommending reducing animal-based foods due to their adverse health and environmental impacts.[34] The "planetary health" diet, developed by the EAT-Lancet Commission, recommends moderate consumption of animal-based foods, with a preference for poultry and fish over red meat such as beef or lamb.[29] However, these global guidelines need to be adjusted to the local context. For example, the EAT-Lancet diet may not be culturally appropriate or affordable for many in low-income populations.[29,35]

National FBDG that recognize the negative environmental impacts of food tend to recommend a maximum daily or weekly consumption amount for high-emission foods such as beef, though recommendations may not be as ambitious as the sustainable dietary changes recommended in the EAT-*Lancet* diet. For example, Germany's new guidelines recommend limiting beef intake to 300g per week while the EAT-Lancet recommendation is 98g per week.[36]

Dietary shifts require consideration of equity and local needs. Those not consuming adequate nutrient amounts or those at risk for malnutrition and who lack access to adequate dietary diversity may need to increase their intake of animal-source foods for high-quality protein and micronutrients. Particularly for young children in Africa, animal-source foods (eggs, dairy, fish and meat), can robustly reduce rates of stunting and wasting[37] and there may still be opportunities to recommend and promote the consumption of animal-based foods with lower environmental impacts, such as eggs or fish.

Many countries have utilized **public health policies** to equitably promote healthier and/or more sustainable diets, such as instituting regulatory actions that limit marketing activities of unhealthy foods, particularly for children, or behavior change interventions.

Increasingly, countries have benefited from **fiscal policies** to direct consumption behavior, such as taxes to reduce consumption of sugar sweetened beverages.[38] More recently, consumption taxes on meat in some European countries are being researched, including a consideration that the revenue might be applied to reduce taxes on fruits and vegetables to aid low-income consumers. [39,40] In the United Kingdom, research showed that pricing unhealthy, unsustainable foods with their "hidden" environmental and health costs—their "true value price"—could change buying habits.[41]

While there is evidence that these policies can support healthier diets, their environmental impact depends on whether consumers substitute these unhealthy foods with more or less sustainable options. For example, reducing sugary drinks or ultra-processed foods will only reduce GHG emissions if those foods are replaced with more sustainable alternatives.

Country Exemplars
Crucial government support for dietary shifts

Mexico has taken a **multi-sectoral approach to promote a more sustainable diet,** to achieve the related goals of mitigation of global warming and the prevention of diet-related non-communicable diseases. A newly-enacted law supports local production of healthy, sustainable foods, including healthy, sustainable procurement standards, shifting production and consumer subsidies away from non-healthy and non-sustainable foods, and strengthening the food environment through taxes, marketing restrictions, front-of-package labeling, and school food standards.[42,43]

Brazil's national school feeding program (PNAE), demonstrates the potential to integrate climate and nutrition priorities. The program spends at least 30% of its procurement budget on foods sourced from family farms, promoting consumption of sustainably produced, minimally processed, diverse, and culturally relevant foods in line with their FBDG.[44,45] Brazil has also begun incorporating environmental sustainability into their FBDG by encouraging consumption of meat alternatives and legumes, and limiting dairy, processed meat, and red meat.[46–48]


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Recommendation 3

Build Climate and Nutrition Resilience for Vulnerable Populations

Problem: Climate shocks increase vulnerability to malnutrition, which in turn reduces climate resilience. Addressing malnutrition is central to building climate resilience for the most vulnerable.

Extreme weather events, such as a heat waves or droughts, can negatively impact health and nutrition, particularly for malnourished populations whose immune systems may already be compromised. In children, these shocks can quickly increase the risks of wasting, underweight, and micronutrient deficiency.[49] Similarly, excessive heat exposure among pregnant women, particularly those with chronic malnutrition, can increase the risk of low birth weight, and reduce breastfeeding and time spent feeding infants and young children.[49,50]

Climate-driven changes in temperatures, rainfall, and humidity are also extending the geographic reach of malaria, dengue, and other infectious diseases.[5] People who are malnourished have compromised immune systems that can make them more vulnerable to infections, which in a vicious cycle can further exacerbate malnutrition.[51] Climate-driven water insecurity can intensify the malnutrition-infectious disease cycle. Lack of clean water for food preparation and hygiene increases the risk of waterborne illnesses, particularly for populations with homes damaged by climate change. In parallel, climate shocks can damage health facilities which reduces access to health and nutrition care.[51]

Leverage Women's Ability to Combat and Adapt to Climate Change

Although climate change and malnutrition disproportionately affect women and girls, women can catalyze action to combat and adapt to climate change. Women and girls are more exposed to and more sensitive to climate shocks, particularly during their reproductive years. Additionally, societal norms lead to a concentration of women in livelihood activities that are likely to be negatively affected by climate change.

Climate change compounds the vulnerability of women and girls who are already malnourished at a staggering scale. In regions like South Asia and West and Central Africa, where half of all women are currently anemic, climate shocks, such as heat waves and droughts, make it even harder for women to make a living, make pregnancy more dangerous, and drain time and energy available for family care.[52]

Women are also central to the food supply chain, as many are smallholder farmers, or they own or work within the often-fragmented food value chain.[53] However, women's work within food systems is often informal and more vulnerable to climate shocks and stressors. Women also face productivity and wage gaps and have less capacity to recover from shocks or adopt anticipatory adaptation measures that reduce their climate risks. Gender inequality and power imbalances often result in women having less socioeconomic power than men, due to less access to resources and information, such as ownership of land or saleable assets, or even access to phones.[19] These constraints limit women's ability to adapt effectively to climate change and to contribute meaningfully to climate adaptation decisions, thereby exacerbating gender inequalities.

Policies to increase women's empowerment have been essential for reducing malnutrition in more than 115 countries, primarily through education and gender equality intervention pathways.[54,55] Studies suggest that when women control household resources, they prioritize food and healthcare spending, which leads to better nutrition outcomes.[54,56,57] Social protection programs and climate-smart agriculture interventions should be gender-responsive to increase women's contributions to climate and nutrition goals and to maximize the impact of these interventions. For example, in many cultures, women's knowledge of traditional seed varieties and practices for seed production can help promote crop diversification and adaptation.[20]

Empowering Women in Benin

In Benin, an intervention that facilitated implementation of solar-powered drip irrigation technology through women's groups successfully boosted crop-production and crop diversity of fruits and vegetables, as well as increased income, and dietary diversity. The increased income enabled women to purchase fish and beans, which improved their household's dietary diversity.[58]

Solution: Scale-up proven interventions to build the resilience of vulnerable populations.

Existing nutrition policies and interventions that improve nutrition in a sustainable way can increase the resilience of vulnerable populations to climate change. Importantly, the GHG emissions of these policies are relatively negligible. Nutrition-sensitive emergency assistance can also address immediate needs after a climate event.

Some proven, high-impact interventions that address malnutrition may also increase the longer-term adaptation and resilience of pregnant women during climate stress. For example, **maternal micronutrient supplementation** is proven to reduce maternal anemia by 49% and the risk of low birthweight babies and stillbirths by 9%.[22] These nutritional interventions can improve the resilience of malnourished women before or during a climate shock.

Promoting and protecting exclusive breastfeeding for the first six months of a child's life is effective at reducing the risk of child stunting, wasting, and infant mortality. During a climate shock, exclusive breastfeeding provides nutrition security for infants who are particularly vulnerable, and avoids the carbon footprint associated with commercial milk formula.[59]

Climate- and gender-responsive social protection policies and programs—such as cash transfers, food vouchers, or school feeding programs—can improve household nutrition security during climate shocks, particularly when integrated with early warning systems. Income losses negatively impact nutrition security and limit households' ability to effectively adapt to climate change. To maximize the effectiveness of these gender-focused programs, they should facilitate increasing women's access to and control over the resources and services they need to adapt to climate change while creating an enabling environment for women's empowerment and gender equality, for example, by addressing harmful norms, unequal laws, and institutional barriers.[57]

Adaptive social protection programs can also address the longer-term impact of climate change and environmental degradation. These programs can be powerful tools to support farmers in shifting away from negative coping strategies, such as selling livestock, reducing investments in their farms, and concentrating their incomes on fewer activities, to make investments in long term adaptation strategies.[22,60]

Country Exemplars
Interventions for Climate and Nutrition

Breastfeeding can promote climate resilience as it promotes healthy brain development and is essential for preventing the triple burden of infectious disease, malnutrition, and mortality. Breastfeeding also reduces the risk of chronic diseases in later life.[61]

In **Zambia, cash transfers increased resilience during severe weather events**. Unconditional cash transfers of 60 Kwacha (about $12 USD), provided in advance of a severe weather event, enabled poor, rural households experiencing weather shocks to increase their food consumption and reduced the likelihood of being severe food insecure by over 20%.[24,49]

Micronutrient supplements can increase climate-related resilience among pregnant women. In a recent study of low-income women exposed to extreme heat in **Pakistan**, those who received multiple micronutrient supplements from three months pre-conception until birth had a reduced risk of adverse birth outcomes when exposed to heat stress. [vii,50]

Cost Effectiveness & Funding

Investing in climate adaptation and mitigation presents an opportunity not only to address climate challenges but also to improve nutrition outcomes. The economic burden of malnutrition is estimated at over US$4 trillion annually in lost productivity due to reduced physical and cognitive abilities. Countries that invest in improved nutrition can experience powerful human capital, economic growth, and prosperity returns—while also realizing climate benefits.[22]

The World Bank recently estimated that every dollar invested in undernutrition returns $23 in value,[22] which is a remarkable cost-benefit ratio. Conversely, the large cost of inaction is estimated at $41 trillion over 10 years[22] highlighting the urgent need to invest in proven nutrition interventions.

Despite the clear economic and societal benefits, climate finance is largely disconnected from food systems and nutrition. Currently, only 4.3% of climate funds are targeted to the food system.[62] This underinvestment is likely due to the lack of awareness of the food system's significant contribution to GHG emissions and siloed financing opportunities.[22] Other climate finance sources, such as the World Bank and the Green Climate Fund, similarly lack integrated nutrition considerations.[10]

Current funding for agriculture can be repurposed and rebalanced to benefit both planetary and nutritional health.[63] Governments should increase public sector support for diverse food systems by investing in food and agricultural research and development that reduces food loss and prioritizes sustainability, diversity, and innovation in food systems beyond profit motives.[64]

> "Every dollar invested in undernutrition returns $23 in value."

vii. Babies born to women who did not receive micronutrient supplementation (MMS) and were exposed to heat stress (defined as >20 days of average daily maximum temperature > 39°C) in the first trimester had significantly lower birth length – calculated as length-for-age Z-score (-0.667 (-1.040,-0.294) for Arm 2, and -0.505 (-0.934, -0.082) for Arm 3 of the trial). Babies born to women who did receive pre-conception and pregnancy MMS did not have significantly smaller birth length, despite also being exposed to heat stress.[50]

Conclusion

Countries can use these evidence-based policy recommendations as entry points to integrate nutrition-sensitive approaches into climate adaptation and mitigation investments in food systems. Strengthening food supply chains to increase the diversity, yield, and nutritional quality of food is critical for climate adaptation with benefits for nutrition. Key policies should include support for climate-smart agricultural practices, scaling biofortification and food fortification, reducing food loss and waste, and repurposing agricultural subsidies.

In parallel, demand-side policies can create an enabling environment for the shift towards sustainable and healthy diets—a necessary step for mitigating emissions from food systems while improving nutrition. These include aligning public food procurement and food-based dietary guidelines with health and sustainability targets, and evidence-based fiscal policies, such as taxes on unhealthy foods, together with interventions to promote sustainable and healthy foods, to support a transition toward more sustainable protein sources and drive down emissions.

At the same time, strengthening nutrition resilience must be prioritized, particularly for vulnerable populations. The World Bank highlights that the return on investment of these interventions far outweighs their costs. Countries can scale up proven, cost-effective nutrition interventions delivered through health and social protection systems to improve nutrition security while maintaining low emissions. Examples include micronutrient supplementation for pregnant women, the promotion and protection of breastfeeding, and nutrition-smart, gender-responsive, climate-smart social protection programs.

To transform food systems to meet climate mitigation targets while supporting adaptation needs, policymakers must address structural barriers, governance failures, and financing silos that hinder access to healthy and sustainable foods. Women, in particular, have a catalytic role to play in climate action and food system transformation. Gender-responsive policies and programs can deliver multiple benefits, strengthening food security, improving nutrition, advancing climate adaption, and driving economic gains.

> Now is the time for national policies and global funding mechanisms to fully integrate climate and nutrition solutions. An investment in nutrition is an unparalleled investment in resilience, sustainability, and human health and wellbeing—one that will define the future of generations to come.

Standing Together for Nutrition

ST4N is multidisciplinary consortium examining the scale and reach of climate crises and their adverse impact on nutrition for millions of vulnerable women and children. This brief was developed with guidance from ST4N's Steering Committee comprised of leading climate, food system, nutrition, gender, and health experts. ST4N is hosted by the Micronutrient Forum, a nonprofit organization and the central global platform for evidence, collaboration, and advocacy on micronutrient health. Learn more about ST4N here.

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